

Cruzane: Hydrology Effects Analysis

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Issues Addressed

Hydrology analyses were completed to ascertain if there was a substantial effect to the hydrological resources from the proposed treatments. No issues with water quality or quantity were identified for the project, because no municipal watersheds are listed, design features would protect water resources, and the project is not expected to have substantial effect on water quality or quantity.

Proposed Action

Wetlands

The National Wetlands Index (NWI) GIS layer shows a total of 2.20 acres of freshwater emergent and freshwater forested/shrub wetlands within Units FB1 and FB2. Project treatments in these units are fuel break construction. Project design features including hand thinning only and implementation of national core best management practices (BMP) will reduce impacts to the wetlands.

Erosion

Erosion modeling was completed using the Forest Service Water Erosion Prediction Project (FSWEPP) program ((Elliot, Hall and Scheele 2000) at <https://forest.moscowfs.wsu.edu/fswepp/>) and with site specific data (climate, slope, soil surface texture, length to drainage, cover percentage, and rock content) to determine upland erosion and sedimentation into stream channels. Upland erosion and sedimentation into stream channels rates are estimated to last up to three years following prescribed burning and five years following wildfire scenarios.

Several proposed treatments scenarios were modeled using FSWEPP web interface. Three weather scenarios are used to determine upland erosion and sediment reaching the stream channel: an average year winter (27.64 inches of precipitation), 15-year winter (37.69 inches of precipitation) in a heavy rain fall winter, and a 30-year winter (42.62 inches of precipitation) in an El Nino type winter.

Modeling results show that there is a slight potential for upland erosion of 0.02 tons per acre and sediment reaching stream channels of 0.01 tons per acre in Unit 18 only in the 15 year and 30-year winter scenarios.

Slope analysis determined that Unit 18 had an average slope of 60 percent and a maximum slope of 76 percent and will be regeneration harvested using a skyline logging system. The results of the wetness model methodology show that unit 18 is mapped as seasonally wet. The proximity of Unit 18 to the St Regus River and Interstate 90 (about 0.25 mile) indicates that Unit 18 and a portion of Unit 19 will need to be dropped from the project to minimize the low to moderate risk of a mass wasting event during a 30-year winter scenario.

See project record 20191216RptErosionx1OverlandB1x for further details on the erosion modeling completed for this project.

Roads

Proposed changes to the transportation system in the project area include designating several unauthorized routes as NFS system routes, decommissioning NFS system roads, and creating several temporary routes for project treatments. Decommissioning activities include treatments to remove the potential for sediment to reach stream channels. Sediment analysis using the Rocky Mountain Research Station (RMRS) GRAIP Lite GIS model was completed on the existing road network, project implementation phase adding temporary routes, and post implementation phase decommissioning routes and temporary roads. Table 1 shows the summary of total sediment reaching the St Regis River at the base of the project area.

Table 1. Sediment Delivery Summary in tons per year

Stream Reach	Existing Sediment	Implementation Sediment	Post Project Sediment
St Regis River at base of Project Area	133.56	164.60	96.89

Implementation of the project will increase the sediment reaching the St Regis River up to 31.04 tons per year (23.24 percent increase) over existing conditions. There will be a total reduction in sediment of 36.67 tons per year (27.46% reduction) compared to the existing condition reaching St Regis River after the post-project decommissioning is completed.

Cumulative Watershed Effects (CWE)

An Equivalent Clear-cut Area (ECA) analysis was completed for the project. The ECA methodology assigns a coefficient for all timber harvests, roads, and fire history in the project watersheds. A value of 1 represents a road. The time frame for full recovery in the ECA methodology is 80 years. Each past harvest was calculated using the assigned coefficient and the time recovery associated to the year 2020. An example is a commercial thin harvested in the year 1980. Coefficient for a commercial thin is 0.25 and is reduced by the time of recovery (40 of 80 years) and the ECA for the year 2020 would be 0.125 multiplied the number of acres in that unit.

Table 2 displays the summary of the existing ECA and proposed ECA as a percentage of NFS lands in the watershed. The proposed CA percentage was calculated using the worst-case scenario that all harvesting occurs in the first year of implementation and will show the maximum percent ECA.

Table 2. Cumulative Watershed Effects Summary

HUC14 Watershed	Total Watershed Acres	NFS Acres	Existing ECA Percentage Year 2020	Proposed ECA Percentage Year 2022
Big Creek	19,441	16,419	6.48	9.77
Packer Creek	11,654	10,361	3.46	6.75

The threshold of concern (TOC) for the ECA methodology is 25 percent. Values over 25 percent would require additional field work, analysis, and design criteria to minimize ECA. The results of the modeling indicate both HUC12 watershed in the project area will be significantly below the TOC. Project design features and national core best management practices will further reduce compaction from proposed treatments.

Clean Water Act

The St Regis River is listed on the Final 2018 Water Quality Integrated Report (Montana DEQ, 2018) as an impaired waterbody for sedimentation and stream temperature with a total maximum daily load required (TMDL). A TMDL for the St Regis Watershed was finalized in 2008 (Montana DEQ, 2008) addressing the sedimentation concerns for the watershed. Roads are generally the number one source of sedimentation in a forested watershed. The Lolo NF completed a review of all FS routes as part of project analysis. The roads proposed for decommissioning will reduce the sediment reaching the St Regis River at the base of the project area by 36.67 tons per year compared to existing conditions.

Consistency with Relevant Laws, Regulations, and Policy

Land and Resource Management Plan

1. Lolo Forest Plan Guidelines 15, 16, 17, and 18

- a. These are forestwide guidelines
- b. These guidelines are relevant to the proposed action
- c. This project is consistent with these guidelines with analysis discussed in this report that included erosion modeling, design features, and implementation of national core BMPs.

Other Relevant Law, Regulation, or Policy

2. Clean Water Act of 1977

- a. Assessment of the section 303(d) list of impaired waterbodies and how project activities may impact these impaired waterbodies.
- b. Review of the 2016 section 303(d) list of impaired waterbodies shows the St Regis River listed in the project area. A TMDL has been finalized to address sedimentation and stream temperatures
- c. This project is consistent with Clean Water Act and the TMDL since There will be a sediment reduction of 36.67 tons per year reaching the St Regis River as a result of completing the project.

3 Executive Order 11990 (1977) Wetlands Management – Requires Federal agencies to follow avoidance, mitigation, and preservation procedures with public input before proposing new construction in wetlands. To comply with Executive Order 11990, the Federal agency would coordinate with the Army Corps of Engineers, under Section 404 of the Clean Water Act, and mitigate for impacts to wetland habitats.

- a. Assessment of the National Wetlands Inventory (NWI) and how project activities may impact these impaired waterbodies.
- b. Review of the NWI shows a total of one freshwater emergent wetlands with a total of 2.20 acres mapped in the project area units.

- c. This project is consistent with Executive Order 11990 because Design Features would protect wetlands.

Conclusion

A hydrological analysis was completed for the Cruzane Mountain project which included erosion modeling, wetland assessment, roads assessment, cumulative watershed effects modeling, and Clean Water Act review. The conclusions drawn from this analysis show no potential for a substantial effect to hydrological resources with implementation of the proposed treatments over the course of the project timelines. This project is consistent with the forest plan, Clean Water Act, and Executive Order 11990.

References Cited

Elliot, W. J., D. E. Hall & D. L. Scheele. 2000. Disturbed WEPP (Draft 02/2000) WEPP Interface for Disturbed Forest and Range Runoff, Erosion and Sediment Delivery.

Montana DEQ 2008. St. Regis Watershed Total Maximum Daily Loads and Framework Water Quality Restoration Assessment. 408 pages

Montana DEQ 2018. Final 2018 Water Quality Integrated Report. 73 pages